

## Unmanned Solar Electric Resource Prospector, Phase I

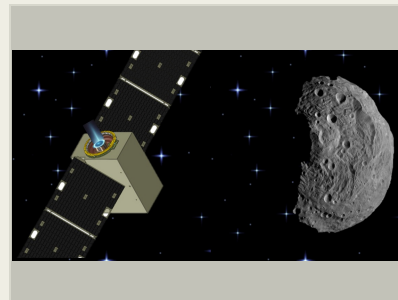
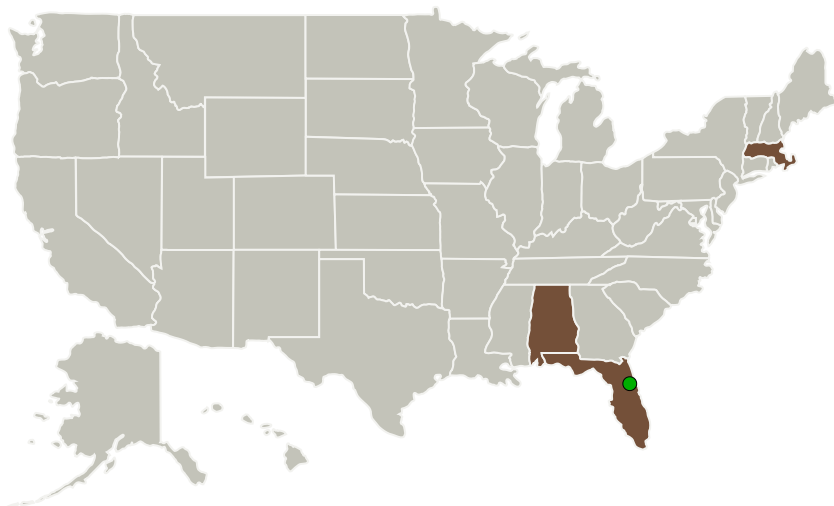
Completed Technology Project (2015 - 2016)



## Project Introduction

The proposed innovation is a spacecraft that could be used for lunar or asteroid prospecting missions. The mission plan would involve sending the spacecraft to an asteroid or other target, and analyzing the regolith for traces of water and other elements to be mined later for in-situ resource utilization. The system features multiple innovations. One is game-changing high delta V solar electric propulsion (SEP) system featuring a hall thruster flowing iodine propellant. Another is a small tethered satellite with an on-board propulsion system that can be used as a modular working arm for the main spacecraft. The proposed Phase I program includes mission analysis, spacecraft, bus, and propellant module design, and identification of sensors and tools to be used for prospecting and plume analysis. Phase I also includes development of an iodine plasma spacecraft interactions model, which is a necessary precursor to any deep space mission with iodine propellant. In Phase II, the entire system including the spacecraft interactions model will be brought to a higher technology readiness level. Both Phase I and Phase II will include plasma plume measurements to support model development and analysis.

## Primary U.S. Work Locations and Key Partners



Unmanned Solar Electric Resource Prospector, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Busek Company, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
The University of Alabama	Supporting Organization	Academia	Tuscaloosa, Alabama

## Primary U.S. Work Locations

Alabama	Florida
Massachusetts	

## Project Transitions

**June 2015:** Project Start**June 2016:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139515>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Busek Company, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

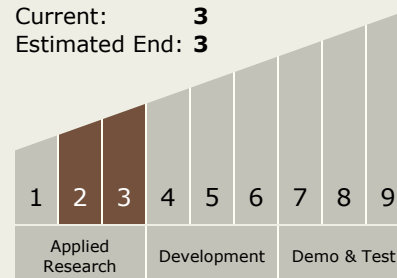
Carlos Torrez

**Principal Investigator:**

James Szabo

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



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## Images



### Briefing Chart Image

Unmanned Solar Electric Resource Prospector, Phase I Briefing Chart Image  
(<https://techport.nasa.gov/image/136054>)



### Final Summary Chart Image

Unmanned Solar Electric Resource Prospector, Phase I Project Image  
(<https://techport.nasa.gov/image/129292>)

## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.2 Electric Space Propulsion
    - └ TX01.2.2 Electrostatic

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System